Idaho Power Company

IPC Smart Grid Program

Abstract

Idaho Power Company's Smart Grid Program includes customer systems, advanced metering infrastructure (AMI), distribution automation, and advanced monitoring equipment for the transmission system. The AMI and customer systems portions provide 475,000 smart meters to nearly all of Idaho Power Company's (IPC) residential and commercial customers. Enhanced billing and on-line energy monitoring systems provide detailed energy use information to help customers better manage their consumption and bills. Smart meters enable IPC to increase its offering of existing time-of-use rates aimed at lowering customer electricity costs in addition to lowering peak load. Peak load is also managed through direct load control devices on participating customers' irrigation systems. IPC is implementing automated feeder switches in Pocatello, Idaho, to improve the reliability of its distribution system. To improve transmission system visibility, IPC is installing phasor measurement units, which increase monitoring capabilities and improve reliability. Advanced applications include enhanced forecasting of renewable generation and short-term demand enabling improved load and generation balancing as renewable power supplies are added to the system.

Smart Grid Features

Communications infrastructure includes power line communications to handle the electricity usage data from the smart meter to the substation. Broadband communications transmit meter data from the substations to the IPC information technology center. IPC is using the power line communications network to operate its existing direct load control devices. The AMI network enables IPC to reduce operating costs and offer direct load control options to more customers. Distribution automation and advanced transmission systems include additional communications infrastructure comprised of fiber optic assets, radio systems, and wireless carriers that enable monitoring and control.

Advanced metering infrastructure includes territory-wide deployment of 475,000 smart meters to residential and commercial customers. The meters provide IPC with detailed usage information to

At-A-Glance

Recipient: Idaho Power Company

State: Idaho and Oregon

NERC Region: Western Electricity Coordinating Council

Total Budget: $98,270,405

Federal Share: $47,000,000

Project Type: Advanced Metering Infrastructure and Customer Systems
Electric Distribution Systems
Electric Transmission Systems

Equipment

- 475,000 Smart Meters
- AMI Communication Networks and Systems
- Web Portal Access for 490,000 Customers
- Distribution System Automation/Upgrade for 12 of 635 Circuits
  - Distribution Management System
  - Communications Equipment/SCADA
  - Automated Distribution Circuit Switches
  - Distributed Energy Resource Interface
- 14 Phasor Measurement Units
- Transmission Line Monitoring System

Time-based Rate Programs Targeting 490,000 Customers

- Time-of-Use Rates

Advanced Applications

- Angle and Frequency Monitoring
- Voltage and Voltage Stability Monitoring
- Post-Mortem Analysis
- Oscillation Energy and Mode Meter Monitoring
- Reactive Reserves Monitoring
- Model Baselining, Validation, and Improvement
- Path Loading and Congestion Management

Key Targeted Benefits

- Reduced Electricity Costs for Customers
- Reduced Meter Reading and Truck Fleet Fuel Costs
- Improved Electric Service Reliability
- Reduced Costs from Equipment Failures, Distribution Line Losses, and Theft
- Optimized Generator Operation
- Deferred Investment in Distribution Capacity Expansion
- Reduced Ancillary Service and Congestion Costs
- Reduced Greenhouse Gas Emissions
- Reduced Operating and Maintenance Costs

Idaho Power Company *(continued)*

support existing and future time variant rates and possibly dynamic pricing. AMI also provides premise-level outage and restoration information, which is integrated with a new outage management system. The detailed outage information helps IPC pinpoint faults, reduce outage duration and restoration times, and improve system reliability. In addition, meter operations and maintenance costs are reduced by the automation of meter reading and service-related tasks.

Advanced electricity service options include an energy-use advising tool that enables two-way information feedback between customers and IPC. The devices allow customers to monitor their energy use and electricity bills through an online Web portal. IPC customer representatives use a similar tool to help inform customers of issues or applicable energy-efficiency incentive programs.

Direct load control devices previously deployed by IPC include irrigation load control devices that now use the power line communications network. The load control devices enable IPC to control the use of irrigation pumps during peak periods. Customers enrolled in the Irrigation Peak Rewards Program receive rebates in exchange for allowing IPC control of their irrigation pumps during peak hours. IPC benefits from the irrigation load control devices through the reduction of peak load and the resulting deferred distribution capacity investments.

Time-based rate programs include time-of-use rate options to a much wider group of customers made possible by the smart meters and a new customer information system. The meters make possible future implementation of other new rate options.

Distribution automation systems include the implementation of feeder switches to automatically sectionalize a faulted section of a feeder and restore power to the un-faulted sections thus reducing the quantity of customers experiencing a sustained outage. The controls are integrated with existing geographical information system and energy management system to provide dispatchers with the information they need to efficiently operate the system. The project also upgrades the associated distribution substations with new microprocessor relays and SCADA systems and improves distribution system reliability.

Distributed energy resources interface and control systems involve enhanced renewable energy forecasting tools that enable IPC to better manage the operations of variable renewable generation such as wind and solar power. Implementation of the forecasting tools, along with automatic generation controls, enable IPC to maintain system balance while reducing the use of fossil fuels.

Advanced transmission systems include a wide-area monitoring, visualization, and control system using synchrophasor technologies that provide IPC with better real-time information on the operation and reliability of the transmission system. A portion of the information is being shared with the Western Electricity Coordinating Council to provide greater visibility and awareness of transmission conditions in western bulk power markets.

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Timeline

Key Milestones	Target Dates
AMI asset deployment begins	Q3 2009
Distribution automation asset deployment begins	Q3 2011
Transmission asset deployment begins	Q2 2010
Distribution automation asset deployment ends	Q4 2012
AMI asset deployment ends	Q1 2012
Program complete	Q2 2013

Contact Information

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